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The Use of Accounting Information in the Measurement of Effective Corporate Tax Rates

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April 1989

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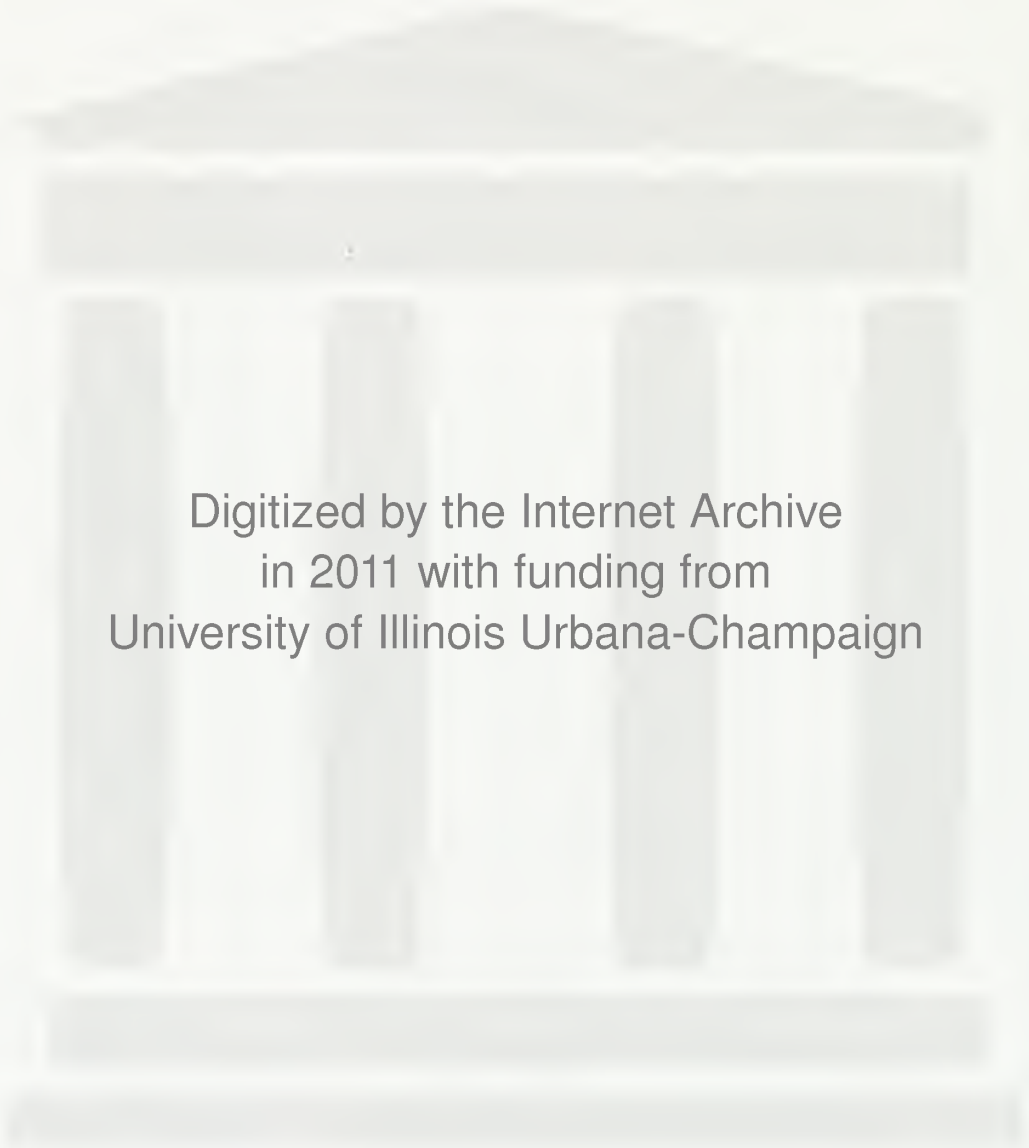
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THE USE OF ACCOUNTING INFORMATION IN THE MEASUREMENT OF EFFECTIVE CORPORATE TAX RATES

ABSTRACT

Given the recent emphasis on effective tax rates by policy makers and accounting researchers, this study investigates the effects of using publicly available financial statement information to estimate effective tax rates. Five effective tax measures used in prior studies were analyzed on a yearly and industry basis. In addition, the associations between firm size and the five measures of effective tax rates were examined. Results indicate that the choice of factors to include in an effective tax rate measure only partially explain differences across the five measures. The accounting treatment of deferred taxes is a major contributor to differences across effective tax measures. The previously documented (Zimmerman, 1983) positive association between size and effective tax rates was found to hold only in large samples, or among selected samples.

THE USE OF ACCOUNTING INFORMATION IN THE MEASUREMENT OF EFFECTIVE CORPORATE TAX RATES

Since 1979, corporations have been taxed at a statutory marginal federal income tax rate of 46 percent and, under the Tax Reform Act of 1986, are currently being taxed at a rate of 34 percent. Few corporations, however, actually pay taxes at this rate since Congress has instituted numerous tax incentives and special provisions that reduce the effective tax rates of many firms below the statutory rate. Some firms have been able to take greater advantage of credits and deductions. For other firms, however, the effective tax rate may exceed the U.S. statutory rate.

The perception of inequalities among firms makes the measurement of effective tax rates for individual corporations important. There have been a number of studies that have compared the relative tax burden among firms, each using a different measure of the effective tax rate. Results from such studies have prompted Congress to enact legislation that attempts to equitably allocate the tax burden across industries.[1] In addition, other studies have examined the relationships between effective tax rates and firm size [e.g., Zimmerman, 1983], capital intensity [e.g., Stickney and McGee, 1982], and the use of limited partnerships [Shevlin, 1987].

The objective of our research is to compare effective tax rate measures that use financial statement information and analyze the relative effect of each measure on the results of a representative study. Zimmerman's 1983 study has been selected for the analysis. We examine the association between effective tax rate measures across and within industries over time. This analysis increases our understanding of the factors that influence the

measurement of corporate tax burdens. As previously cited, various accounting studies have incorporated effective tax rates in their models but since tax data are confidential, most rely on accounting information to calculate an effective tax rate measure. Without a thorough examination of the differences among measures and the factors that contribute these differences, inferences from previous studies may be suspect.

Using COMPUSTAT data, we provide a detailed examination of five effective tax rate measures used in previous research. Our results suggest that, in large sample situations, the associations between size and the five effective tax rate measures are consistent with Zimmerman's results. However, when firms are grouped by their treatment of deferred taxes, the relationships between size and effective tax rates is measure specific. This finding suggests that, in most accounting studies where small samples are used, results using an effective tax rate variable may be sample and measure specific.

The remainder of the paper is organized as follows. Section I defines the effective tax rate measures employed in prior research. Section II discusses the associations between effective tax rates measures and year of computation (1980-1986). Section II also discusses differences between industries. Section III discusses the relationship between effective tax rates and firm size and section IV provides a summary of the results.

I. Effective Tax Rate Measurements

Since tax return data are confidential, financial statement data often are used to measure effective tax rates. The income tax expense for financial reporting purposes is separated into two parts - current and

deferred. The current income tax expense represents the current amount of taxes payable while the deferred income tax expense represents a liability for taxes which will be payable in some future year. Deferred taxes result from timing differences between the reporting of revenue and expenses for financial statements and tax purposes.

Prior studies show that the definition of effective tax rate varies. For example, the Joint Committee on Taxation [1984] used the following formula in its annual report to measure the tax burdens of U.S. corporations by industry:

$$\text{Effective Tax Rate} = \frac{\text{Current Tax Expense}}{\text{Pretax Book Income-Equity Loss/Income from Unconsolidated Subsidiaries}} \quad (1)$$

In the numerator, taxes are measured by current tax expense rather than by the total provision for taxes. The Joint Committee believes that, since deferred taxes often roll over from one year to the next during a period of growth or inflation, they may not be paid until many years in the future. Additionally, they claim that corporations may overstate the accrued income tax liability and thus overstate the provision for taxes in order to provide a "cushion" for potential increases in tax liability resulting from IRS examinations. Typically, any cushion is reflected in the deferred rather than the current provision.

The current portion of state and local tax expenses is excluded from the numerator. Similarly, the current tax expense (or savings) attributable to extraordinary items and discontinued operations also are eliminated in the numerator. Thus, the current tax liability is the sum of current Federal and foreign tax expenses.

Total before-tax worldwide financial income constitutes the denominator. Gains and losses from unconsolidated subsidiaries, extraordinary items, and discontinued operations are excluded.

Porcano [1986] uses essentially the same formula as the Joint Committee except for two items. First, his numerator consists of only current U.S. Federal taxes because he is interested in the U.S. effective tax rate. Second, he incorporates all gains and losses from extraordinary items and discontinued operations into the denominator. Thus, if a net loss results from extraordinary items or discontinued operations, Porcano's denominator generally should be smaller than the Joint Committee's.

Zimmerman [1983] uses the following measure in his study of the relationship between effective tax rates and firm size:

$$\text{Effective Tax Rate} = \frac{\text{Total Tax Expense - Change in Deferred Taxes \&ITC}}{\text{Operating Cashflows}} \quad . \quad (2)$$

Income taxes are computed as total (worldwide) income tax expense, including state and local taxes, less the change in deferred taxes and tax deferred investment tax credits as reported on the balance sheet. He claims that subtracting the change in the deferred tax liability plus deferrals of investment tax credits (ITC) is an approximate adjustment for the temporary timing differences between tax and book accrual accounting.

Note that the numerators used by Zimmerman and the Joint Committee will differ when: 1) the change in the deferred tax liability does not equal the deferred tax expense, 2) tax rules limit the use of ITCs in the current period, and 3) state and local taxes exist. The relationship of the deferred tax expense to the change in the deferred tax liability for the

current year will be further explored in later sections of this paper.

In the denominator, Zimmerman uses operating cashflows (as opposed to earnings) because it excludes the effects of accrual accounting procedures, which vary with firm size [Hagerman and Zmijewski (1979)]. Operating cashflows are measured by the difference between sales and cost of goods sold. Zimmerman contends that the use of operating cashflows in his denominator more closely corresponds with his numerator in which he approximates taxes in terms of the current tax liability.

Shevlin [1987] uses a different effective tax rate measure determined as follows:

$$\text{Effective Tax Rate} = \frac{\text{Total Tax Expense - Change in Deferred Taxes}}{\text{Pretax Income - } \frac{\text{Change in Deferred Tax}}{\text{Statutory Marginal Tax Rate}}} \quad (3)$$

Shevlin defines his numerator as total (current plus deferred) tax expense less the change in the deferred tax liability [p. 492, footnote 10]. Note that Zimmerman's numerator is slightly different because he specifically incorporates tax deferred investment tax credits whereas Shevlin does not mention this factor in his measure.

Income derived from timing differences is eliminated from the denominator by grossing up the change in the deferred tax account on the balance sheet by the statutory marginal tax rate. The smaller denominator more closely reflects the taxable income of the firm. Based on a comparison of the denominators, Shevlin's measure should produce higher effective tax rates than Zimmerman's measure unless pretax income is negative.

In another study, Stickney and McGee [1982] conclude that the use of financial leverage and accelerated depreciation have given rise to lower effective tax rates for highly-levered, capital intensive firms. The effective tax rate employed by Stickney and McGee is defined below:

$$\text{Effective Tax Rate} = \frac{\text{Current Income Tax Expense}}{\text{Pretax Book Income} - \frac{\text{Deferred Tax Expense}}{\text{Statutory Marginal Tax Rate}}} \quad . \quad (4)$$

Stickney and McGee state that the numerator should include the combined taxes (federal, foreign, state and local) actually payable for the year to all governmental units in order to obtain a more meaningful indication of the tax burden. Their calculation of current income tax expense is equal to the total book income tax expense minus the deferred income tax expense. Once again, Stickney and McGee's numerator may be different from Shevlin's if the change in the deferred tax liability is not equal to the deferred tax expense on the income statement.

The tax base in the denominator is equal to book income before taxes, adjusted for the effect of timing differences. Stickney and McGee claim that pretax book income amounts are not comparable across firms because firms use different methods of accounting for computing book income. In an effort to filter out the effect of using different accounting methods, book income was adjusted by dividing the deferred tax expense by the statutory tax rate. Stickney and McGee maintain that this adjustment provides a more uniform tax base in the denominator.[2]

Variations in effective corporate tax rates should provide a measure of one firm's tax burden relative to another. Changes in the tax law, whether due to timing or permanent differences, should be captured by an

appropriate effective tax rate measure. In the next section, the five measures are compared to determine if they are correlated within a particular industry across time.

II. Correlations of Measures Over Time

Firm-specific COMPUSTAT data for the years 1980-86 were used to compute the five effective tax rate measures discussed above for each of the years.. The measures were computed for a maximum of 1,164 firms in a single year. The firms initially were grouped according to industry to facilitate comparisons. We have chosen two of the industries analyzed to illustrate empirical differences in the measures.

Figures 1a and 1b show mean and median values for the five effective tax rates for firms involved in the preparation of pharmaceuticals. The results are relatively stable and reflect the expected relationships among the five measures.

Insert Figures 1a and 1b

The mean effective tax rates calculated using the Joint Committee and Porcano's formulas appear to be highly correlated. Since the Joint Committee includes foreign taxes in the numerator, its effective rates are higher as expected. For federal tax purposes, a credit is given for all foreign taxes paid. Thus, if a multinational firm has a large amount foreign income, an analysis based on only U.S. taxes may be misleading. A comparison of Zimmerman's and Shevlin's mean and median measures shows that the effective tax rates are higher under Shevlin's formula. Zimmerman and

Shevlin use essentially the same numerator except for tax deferred ITCs. The difference in magnitude of the two measures is due to the denominators. In one case, Zimmerman's denominator was as much as eight times greater than Shevlin's.

As previously discussed, Stickney and McGee's and Shevlin's measures are essentially the same except that Stickney and McGee subtract the deferred tax expense from total taxes to obtain current taxes payable whereas Shevlin subtracts the change in the deferred tax liabilities from total taxes. Only the means for 1986 and the medians for 1985 were affected by this difference within the pharmaceutical industry.

Figures 2a and 2b present some rather disturbing results when the mean and median values for the five effective tax rate measures are plotted for the petroleum refining industry. Based on Porcano's measure, the petroleum industry is viewed as paying relatively little or no taxes in 1984; however, the Joint Committee's measure, which incorporates foreign taxes paid, shows that corporate tax rates actually increase in 1984.

Insert Figures 2a and 2b

Zimmerman's model is relatively stable throughout the seven years and appears insensitive to changes in the tax law. When the medians for Shevlin and Stickney and McGee are compared, they are highly correlated; however, a comparison of the means shows divergent results for 1984 and 1985. The mean effective tax rate using Shevlin's model reflects a substantial increase in taxes paid by the petroleum industry in 1985

whereas Stickney and McGee's model shows a slight decrease.

Given these results, the choice of a particular measure may lead to different conclusions about the tax payments of firms within an industry. The selection of a particular year for evaluating a firm's relative tax burden is very critical as seen in Figures 2a and 2b. In addition, the use of medians versus means may influence the results at the industry level.

In Table 1, Spearman Rank correlations between measures for each year are presented for the total sample.[3] Only firms containing complete data for calculating all five measures are included.

Insert Table 1

For each year, a comparison of Shevlin and Stickney and McGee's measures produced the highest rank order correlation coefficients, ranging between 0.939 and 0.967. Porcano and the Joint Committee's effective tax rates were also very highly correlated, ranging between 0.769 and 0.821. The lowest correlation was found between Zimmerman and the Joint Committee for 1980-1983, Zimmerman and Porcano for 1984-1985, and Zimmerman and Stickney and McGee for 1986. The mean and median values for the total sample are shown in Figures 3a and 3b and support the correlation statistics.

Insert Figures 3a and 3b

As previously discussed, Stickney and McGee's and Shevlin's measures are essentially the same except that Stickney and McGee subtract the deferred

tax expense from total taxes to obtain current taxes payable whereas Shevlin subtracts the change in the deferred tax liability from total taxes. They each make a corresponding adjustment to the denominator. If the deferred tax expense always equals the change in the deferred tax liability, the two formulas would be perfectly correlated; however, differences exist. Both Porcano and the Joint Committee indirectly subtract the deferred tax expense from total taxes to estimate current tax expense. Zimmerman subtracts the change in the deferred tax liability plus tax deferred investment tax credits from total taxes to approximate current taxes.

Treatment of Deferred Taxes

In the total sample, approximately two-thirds of the firms reported a difference between the deferred tax expense and the change in the deferred tax liability on COMPUSTAT. One reason for this difference is that the deferred tax liability is divided into current and long-term categories for financial reporting. The change in the deferred account as labeled by COMPUSTAT only captures the long-term portion. Current deferred tax assets and liabilities are frequently grouped together with other accounts for reporting purposes.

A second reason for the difference is that an acquiring company may report deferred taxes previously reported by the acquired company if the deferred taxes (a) relate to a current asset or current liability on the acquired company's balance sheet at the date of acquisition or (b) relate to an asset not reported on the acquired company's balance sheet at the date of acquisition. Instances such as these would give rise to a change

in deferred tax balances reflected in the balance sheet without a corresponding deferred provision effect (APB Opinion No. 16, Paragraph 89).

A third explanation is that most companies maintain tax cushion accounts which are established to provide a reserve for the potential permanent tax effects of future settlements. Such accounts are often grouped together with deferred income taxes for balance sheet reporting. Transactions such as the crediting of prior tax refunds and the recording of settlement payments directly against the cushion accounts would impact the flow of deferred income taxes without affecting the provision for income taxes.

It would appear that a company's ability to manipulate the deferred tax liability should be considered in the selection of the appropriate tax rate measure for a particular study. The effect on measures of effective tax rates due to differences between deferred tax expense and the change deferred tax liabilities is analyzed in the next section.

III. Firm Size and Effective Tax Rates

As previously discussed, the analysis of an industry's relative tax burden is dependent upon the selection of the effective tax rate measure. In this section, Zimmerman's 1983 study is reexamined in order to determine whether the use of a particular measure or data base yields conflicting results.

Zimmerman examined the association between tax related political costs and firm size. Zimmerman's measure of these political costs is the firm's effective tax rate. After the Tax Reform Act of 1969, he found that the fifty largest firms were more likely to have higher tax rates than other firms. Moreover, he concluded that this relationship was robust to (i)

alternative measures of tax rates, (ii) alternative sources of data, and (iii) different measures of firm size.

Using net sales as a measure of firm size, the association between sales and the five leading effective tax rate measures (one of which was used by Zimmerman) is measured.[4] The Spearman Rank correlation coefficients between sales and effective tax rate measures for the total sample are shown in Table 2 for each year. These results support Zimmerman's findings that a positive association exists between firm size and tax rate and that this relationship is robust to alternative measures of tax rates.[5]

Insert Table 2

Based on our discussion of the reporting of deferred taxes on COMPUSTAT the total sample was then divided into three subsamples consisting of those firms in which the deferred income tax expense is (a) equal to, (b) greater than, and (c) less than the change in the deferred tax liability on the balance sheet. The corresponding correlations coefficients are reported in Tables 3, 4, and 5, respectively.

Insert Tables 3, 4, and 5

In the first sample (Table 3), when the deferred income tax expense equals the change in the deferred tax liability, sales and effective tax rates are more positively correlated than in the total sample. All of the coefficients are positive and statistically significant.

In the second sample (Table 4), when the deferred tax expense is greater than the change in the deferred tax liability, some of the coefficients between sales and effective tax rates become negative and only six out of thirty-five are significant. In 1980, use of the Joint Committee's measure produces a significant positive correlation whereas Porcano's measure shows a significant negative association.

Furthermore, in the third sample (Table 5), the majority of the coefficients are negative with five out of thirty-five significant. For 1981, three of the measures reflect a significant negative association between firm size and tax rate.

Thus, the results of these tests provide evidence that the positive association observed by Zimmerman is not robust with respect to sample composition nor effective tax rate measure. It appears that in a large sample where all three relationships between income statement and balance sheet deferred tax accounts are represented the differing results are nullified and Zimmerman's findings are supported. On the other hand, in a smaller sample (similar to sample sizes encountered in most accounting studies) or samples that are largely dominated by firms in either group two or three, inferences may be suspect. As shown in Appendix A, the mean size of firms in group two and three is significantly larger than in group one. Based upon this evidence, it appears that larger firms tend to make changes in their deferred tax liabilities without a corresponding effect on the income statement.[6]

Figures 4a through 6b contain the mean and median values for each of the three samples, respectively. Note that in Figures 4a and 4b, for the firms

in which the deferred income tax expense equals the change in the deferred tax liability, Shevlin's and Stickney and McGee's measures are perfectly correlated.

Insert Figures 4a through 6b

A comparison of the median values from this sample and the second sample clearly leads to different conclusions as to the tax burdens imposed on firms during a given year. In fact, when the firms report a deferred tax expense equal to the change in the deferred tax liability (Figure 4b), the median values for all effective tax rate measures decrease or remain constant in 1986. However, when the deferred tax exceeds the change in deferred tax liability as reported by the firms in the second sample (Figure 5b), all measures show an increase in effective tax rates for 1985. In the third sample, when the deferred tax expense reported by the firms is less than the change in the deferred tax liability, the median values also increase or remain constant for 1986 (Figure 6b).

Shevlin's measure and Stickney and McGee's measure are highly correlated in both the second and third sample except that in Figure 5a Shevlin's effective tax rates are higher and in Figure 6a Stickney and McGee's rates are higher. This relationship exists because Shevlin defines current taxes as net of the change in the deferred tax liability and Stickney and McGee define current taxes as net of the deferred income tax expense. Thus, if the deferred income tax expense is less than the change in the deferred tax liability, Stickney and McGee's measure should be greater (Figure 6a).

Differences between the second and third sample also exist with respect to relative increases and decreases in tax burdens for a particular year. However, the extremes represented among the measures in sample one are not present.

IV. Summary

In this study, we show that the choice of a particular effective tax rate measure may provide conflicting findings as to the relative tax burdens of firms within an industry and across industries. In addition, the use of means versus medians may lead to opposite results regarding whether an industry's effective tax rate has increased or decreased during a particular year.

One factor that causes these measures to significantly differ is the accounting treatment of deferred taxes. Some firms adjust their deferred tax liabilities without a corresponding effect on the income statement. By reexamining Zimmerman's study, this study found that when firms are grouped by their treatment of deferred taxes, the relationship between size and effective tax rates is measure dependent. This finding suggests that when accounting information is used in studies involving taxes the results may be influenced by the selection of the sample and effective tax rate measure. Consequently, studies that incorporate changes in the deferred tax liability as a part of their effective tax rate estimate may provide estimated tax rates that do not represent the current tax burden of the firm.

ENDNOTES

1. For example, the Citizens for Justice [1985] published findings which showed that, despite large amounts of reported financial income, the effective tax rates for some Fortune 500 firms approach or equal zero. Birnbaum and Murray [1987] suggest that these findings encouraged Congress to enact the new alternative minimum tax that subjects all corporations to taxation on one-half of the difference between their financial accounting income and taxable income.

2. Bernard's [1984] criticism of Stickney and McGee is that given the way effective tax rates are measured, the use of financial leverage or accelerated depreciation would have no impact upon those rates. He concludes that the Stickney-McGee tax rate can be influenced only by tax credits or permanent differences between book income and taxable income.

3. Because each measure shows extreme values, various restrictions were used to define acceptable values. All rank correlations were reproduced using values between -2 and 2, between 0 and 2, and between 0 and the maximum positive value for each measure. The results were consistent across all definitions. Spearman Rank correlations were used because the relative rankings of the tax burden among firms appears to be more important than the absolute numbers. In most instances, the product moment correlation is significantly less. See Appendix A of summary statistics for each measure by year.

4. See Appendix A for a complete distribution of the size variable.

5. Some researchers have suggested that Zimmerman's results were determined by the oil and gas producers in his sample. Figure 2 indicates that this might be a reasonable assertion. However, results consistent with Zimmerman's were obtained when oil and gas producers were excluded from the sample.

6. The negative and significant association between Size and Porcano's measure occurs because Porcano excludes foreign taxes from his numerator. Since larger firms are more likely to be involved in foreign operations, such a relationship might be expected.

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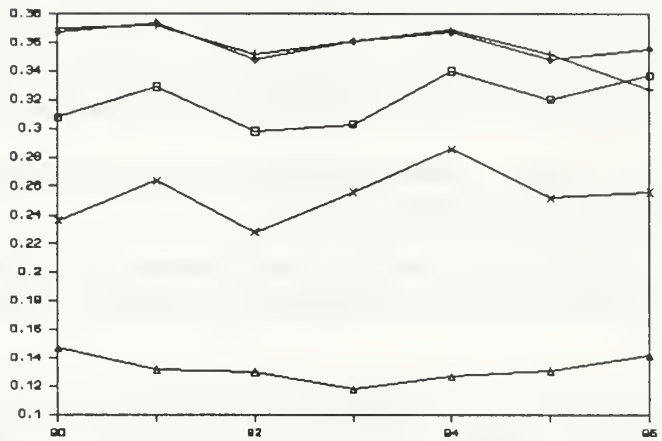
Figures 1a and 1b

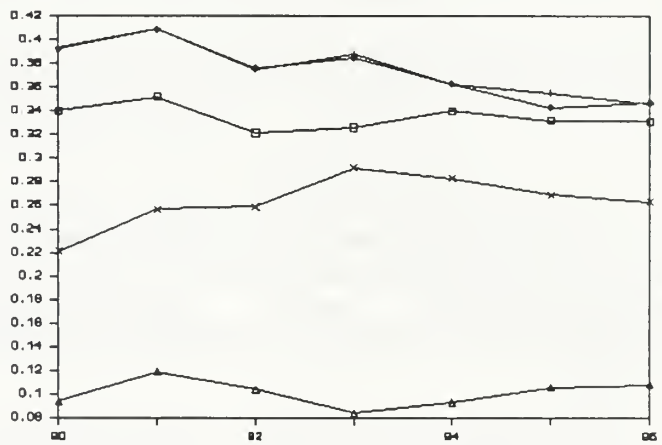
Mean and Median Values of Effective Tax Rate Measures
for the Pharmaceutical Industry

Mean
Effective
Tax Rate



Year

Median
Effective
Tax Rate



Year

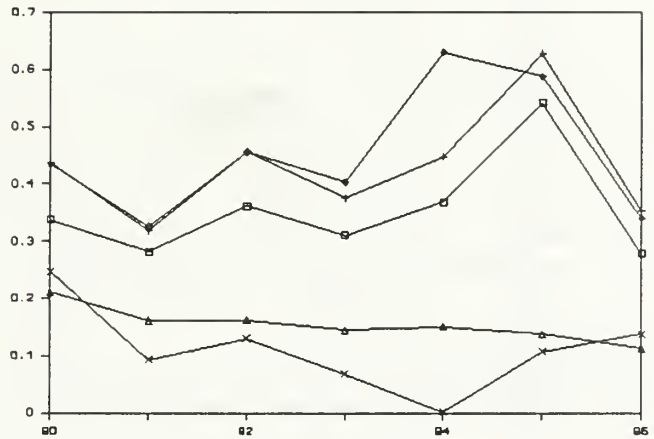
Legend

□ = Joint Committee
\+ = Shevlin
◇ = Stickney and McGee
△ = Zimmerman
× = Porcano

Figures 2a and 2b

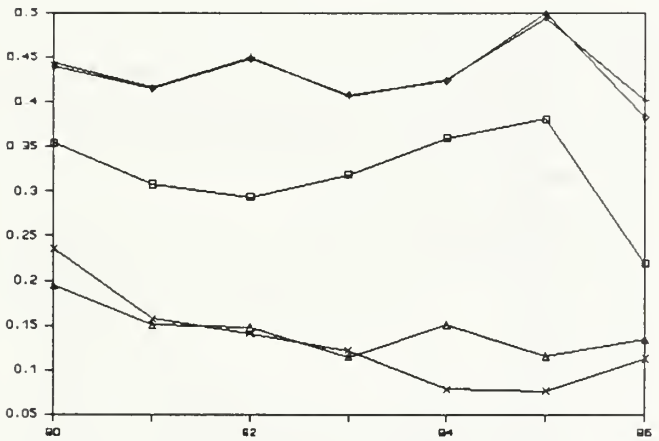
Mean and Median Values of Effective Tax Measures
for the Petroleum Refining Industry

Mean
Effective
Tax Rate



Year

Median
Effective
Tax Rate



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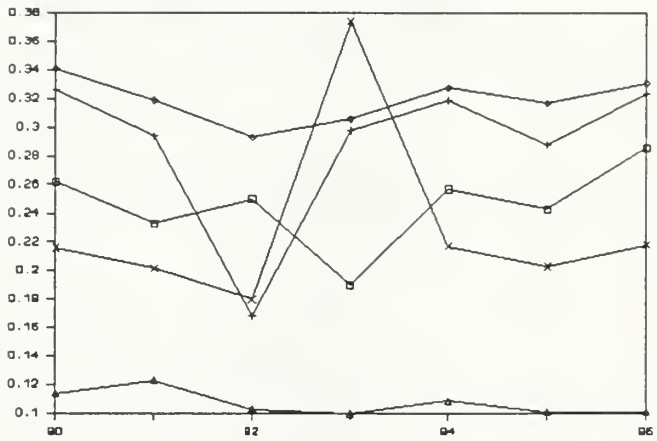
Legend

□ = Joint Committee
\+ = Shevlin
◇ = Stickney and McGee
Δ = Zimmerman
× = Porcano

Figures 3a and 3b

Mean and Median Values of Effective Tax Measures
for the Total Sample

Mean
Effective
Tax Rate



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Median
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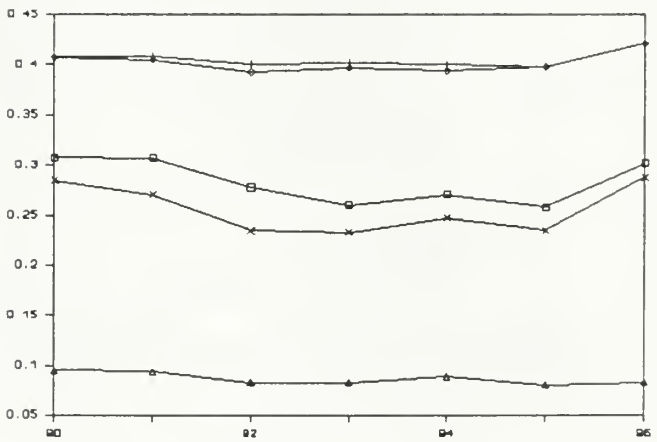

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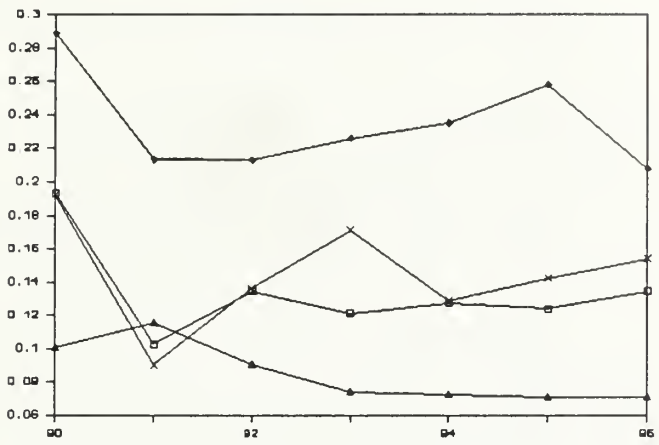
Legend

□ = Joint Committee
\+ = Shevlin
◇ = Stickney and McGee
△ = Zimmerman
× = Porcano

Figures 4a and 4b

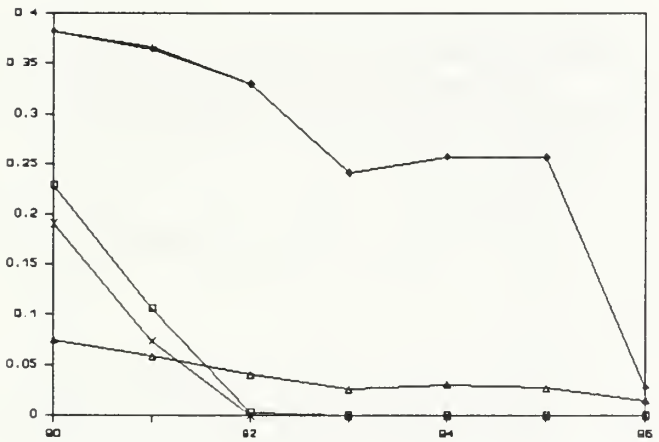
Mean and Median Values of the Effective Tax Measures
(Deferred Income Tax Expense = Change in Deferred Tax Liability)

Mean Effective Tax Rate



Year

Median Effective Tax Rate



Year

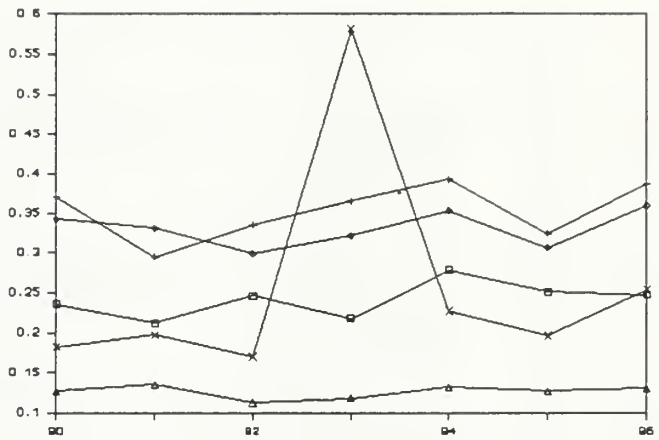
Legend

□ = Joint Committee
\+ = Shevlin
◇ = Stickney and McGee
Δ = Zimmerman
× = Porcano

Figures 5a and 5b

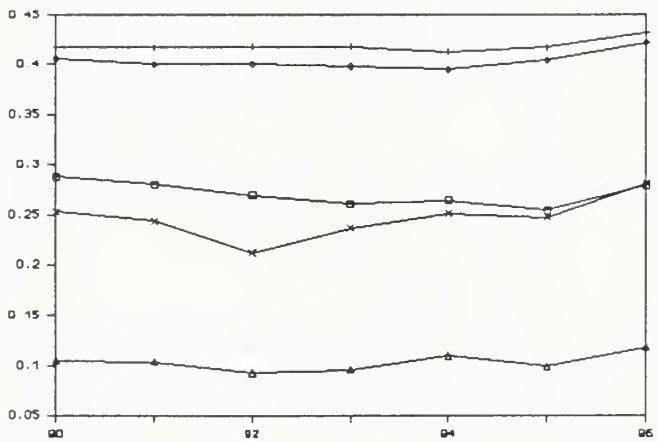
Mean and Median Values of Effective Tax Measures
(Deferred Income Tax Expense > Change in Deferred Tax Liability)

Mean Effective Tax Rate



Year

Median Effective Tax Rate



Year

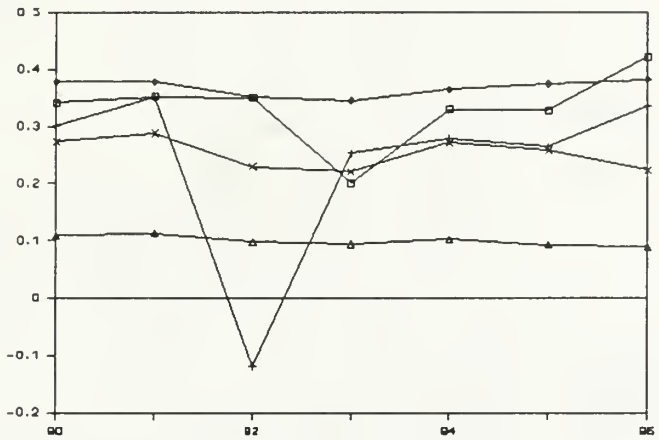
Legend

□ = Joint Committee
\+ = Shevlin
◇ = Stickney and McGee
Δ = Zimmerman
× = Porcano

Figures 6a and 6b

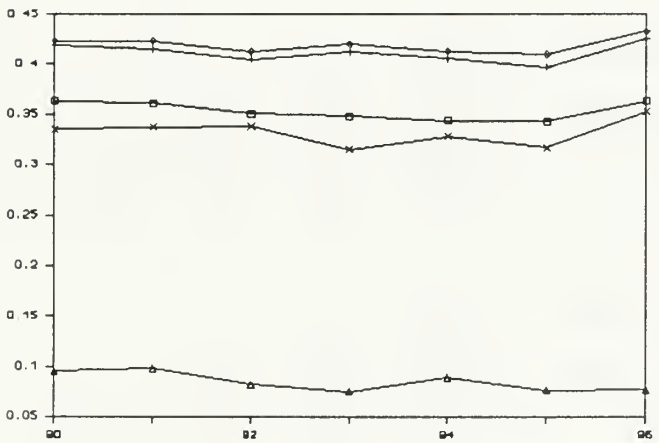
Mean and Median Values of Effective Tax Measures
(Deferred Income Tax Expense < Change in Deferred Tax Liability)

Mean Effective Tax Rate



Year

Median Effective Tax Rate



Year

Legend

□ = Joint Committee
+ = Shevlin
◇ = Stickney and McGee
Δ = Zimmerman
× = Porcano

Table 1

Spearman Correlation
Between Effective Tax Measures by Year
Total Sample

1980 (n=1137)

Joint Committee (JT)	1.00				
Shevlin (SH)	0.665	1.00			
Stickney-McGee (SM)	0.691	0.962	1.00		
Zimmerman (ZIM)	0.561	0.634	0.595	1.00	
Porcano (POR)	0.815	0.634	0.662	0.582	1.00
	JT	SH	SM	ZIM	POR

1981 (n=1002)

Joint Committee (JT)	1.00				
Shevlin (SH)	0.645	1.00			
Stickney-McGee (SM)	0.684	0.966	1.00		
Zimmerman (ZIM)	0.574	0.658	0.616	1.00	
Porcano (POR)	0.802	0.639	0.669	0.575	1.00
	JT	SH	SM	ZIM	POR

1982 (n=842)

Joint Committee (JT)	1.00				
Shevlin (SH)	0.641	1.00			
Stickney-McGee (SM)	0.701	0.948	1.00		
Zimmerman (ZIM)	0.558	0.673	0.643	1.00	
Porcano (POR)	0.768	0.614	0.653	0.573	1.00
	JT	SH	SM	ZIM	POR

1983 (n=1164)

Joint Committee (JT)	1.00				
Shevlin (SH)	0.645	1.00			
Stickney-McGee (SM)	0.690	0.959	1.00		
Zimmerman (ZIM)	0.583	0.671	0.625	1.00	
Porcano (POR)	0.821	0.622	0.660	0.583	1.00
	JT	SH	SM	ZIM	POR

1984 (n=1013)

Joint Committee (JT)	1.00				
Shevlin (SH)	0.615	1.00			
Stickney-McGee (SM)	0.673	0.952	1.00		
Zimmerman (ZIM)	0.577	0.623	0.565	1.00	
Porcano (POR)	0.815	0.624	0.657	0.564	1.00
	JT	SH	SM	ZIM	POR

Table 1 (continued)

1985 (n=878)

Joint Committee (JT)	1.00				
Shevlin (SH)	0.661	1.00			
Stickney-McGee (SM)	0.703	0.944	1.00		
Zimmerman (ZIM)	0.597	0.628	0.586	1.00	
Porcano (POR)	0.807	0.622	0.642	0.568	1.00
	JT	SH	SM	ZIM	POR

1986 (n=771)

Joint Committee (JT)	1.00				
Shevlin (SH)	0.591	1.00			
Stickney-McGee (SM)	0.667	0.938	1.00		
Zimmerman (ZIM)	0.507	0.525	0.484	1.00	
Porcano (POR)	0.814	0.592	0.653	0.524	1.00
	JT	SH	SM	ZIM	POR

Table 2

Spearman Rank Correlations Between Effective Tax Measures and Size by Year (Total Sample)*

	JT	SH	SM	ZIM	POR
SIZE-80	0.20359	0.06060	0.06557	0.09869	0.03784
(n=1137)	0.0001	0.0410	0.0271	0.0009	0.2023
SIZE-81	0.16727	0.03450	0.05660	0.05130	0.01632
(n=1002)	0.0001	0.2752	0.0733	0.1046	0.6059
SIZE-82	0.20681	0.09433	0.11388	0.09518	0.04130
(n=842)	0.0001	0.0062	0.0009	0.0057	0.2312
SIZE-83	0.27114	0.18095	0.18794	0.18086	0.11839
(n=1164)	0.0001	0.0001	0.0001	0.0001	0.0001
SIZE-84	0.25314	0.18191	0.18274	0.17959	0.13377
(n=1013)	0.0001	0.0001	0.0001	0.0001	0.0001
SIZE-85	0.23737	0.18246	0.19249	0.18480	0.12281
(n=878)	0.0001	0.0001	0.0001	0.0001	0.0003
SIZE-86	0.20626	0.18434	0.19271	0.20064	0.14489
(n=771)	0.0001	0.0001	0.0001	0.0001	0.0001

Legend

SIZE = Net Sales.

* P-Value is presented below the correlation.

Table 3

Spearman Rank Correlations Between Effective Tax Measures and Size by Year*
(Deferred Income Tax Expense = Change in Deferred Tax Liability)

	JT	SH	SM	ZIM	POR
SIZE-80	0.43405	0.27918	0.27918	0.26656	0.36606
	0.0001	0.0001	0.0001	0.0001	0.0001
SIZE-81	0.30671	0.19348	0.18915	0.16933	0.23799
	0.0001	0.0031	0.0038	0.0098	0.0003
SIZE-82	0.26143	0.17499	0.17509	0.16953	0.18812
	0.0002	0.0121	0.0120	0.0151	0.0069
SIZE-83	0.33931	0.36679	0.36632	0.33719	0.34270
	0.0001	0.0001	0.0001	0.0001	0.0001
SIZE-84	0.29665	0.27369	0.27360	0.36781	0.28489
	0.0001	0.0001	0.0001	0.0001	0.0001
SIZE-85	0.42563	0.42456	0.41928	0.45143	0.42755
	0.0001	0.0001	0.0001	0.0001	0.0001
SIZE-86	0.33753	0.32280	0.33805	0.41846	0.34134
	0.0001	0.0001	0.0001	0.0001	0.0001

Legend

SIZE = Net Sales

* P-Value is presented below the correlation.

Table 4

Spearman Rank Correlations Between Effective Tax Measures and Size by Year*
(Deferred Income Tax Expense > Change in Deferred Tax Liability)

	JT	SH	SM	ZIM	POR
SIZE-80	0.08382	-0.07426	-0.03777	-0.00595	-0.08174
	0.0744	0.1141	0.4226	0.8993	0.0819
SIZE-81	0.05660	-0.07178	-0.01692	-0.03892	-0.10091
	0.2355	0.1319	0.7227	0.4144	0.0339
SIZE-82	0.15836	-0.02284	0.03209	0.01417	-0.06048
	0.0019	0.6563	0.5324	0.7825	0.2383
SIZE-83	0.18630	0.03632	0.05754	0.03115	-0.01511
	0.0001	0.4027	0.1847	0.4730	0.7279
SIZE-84	0.15480	0.09821	0.10743	0.01990	-0.00884
	0.0009	0.0366	0.0222	0.6726	0.8512
SIZE-85	0.03769	0.00077	0.01739	-0.04314	-0.07669
	0.4783	0.9885	0.7436	0.4171	0.1487
SIZE-86	-0.02798	0.02270	0.03147	-0.03979	-0.10896
	0.6346	0.6997	0.5929	0.4989	0.0634

Legend

SIZE = Net Sales

* P-Value is presented below the correlation.

Table 5

Spearman Rank Correlations Between Effective Tax Measures and Size by Year*
(Deferred Income Tax Expense < Change in Deferred Tax Liability)

	JT	SH	SM	ZIM	POR
SIZE-80	0.07631	-0.03396	-0.05025	0.03164	-0.15658
	0.1315	0.5026	0.3210	0.5322	0.0019
SIZE-81	-0.00365	-0.09888	-0.09955	-0.04569	-0.22287
	0.9475	0.0737	0.0718	0.4095	0.0001
SIZE-82	-0.03794	-0.07299	-0.07104	-0.05379	-0.19632
	0.5464	0.2455	0.2584	0.3924	0.0016
SIZE-83	0.12309	0.06211	0.06934	0.06166	-0.06538
	0.0209	0.2451	0.1943	0.2486	0.2211
SIZE-84	-0.02359	-0.00102	-0.03397	-0.01839	-0.13919
	0.6785	0.9857	0.5506	0.7467	0.0140
SIZE-85	0.03548	0.07361	0.07341	0.04748	-0.11348
	0.5459	0.2098	0.2110	0.4189	0.0527
SIZE-86	0.03134	-0.00506	0.00143	-0.01724	-0.00645
	0.5938	0.9314	0.9806	0.7693	0.9126

Legend

SIZE = Net Sales

* P-Value is presented below the correlation.

THE USE OF ACCOUNTING INFORMATION IN THE MEASUREMENT OF EFFECTIVE CORPORATE TAX RATES

Appendix A

Table A1

Summary Statistics for Effective
Tax Measures by Year
(Total Sample)

1980 (n=1137)

Measure	Mean	Median	Min	Max
Joint Committee	0.262	0.308	-2.817	5.2
Shevlin	0.326	0.408	-12.012	1.4
Stickney and McGee	0.341	0.407	-1.741	3.6
Zimmerman	0.114	0.095	-0.184	1.1
Porcano	0.216	0.285	-8.481	2.8

1981 (n=1002)

Measure	Mean	Median	Min	Max
Joint Committee	0.233	0.307	-13.423	7.4
Shevlin	0.294	0.409	-30.223	4.2
Stickney and McGee	0.319	0.405	-8.837	9.6
Zimmerman	0.123	0.094	-0.273	3.7
Porcano	0.202	0.271	-12.990	1.6

1982 (n=842)

Measure	Mean	Median	Min	Max
Joint Committee	0.250	0.278	-3.927	6.44
Shevlin	0.168	0.401	-68.134	3.03
Stickney and McGee	0.293	0.393	-7.898	4.97
Zimmerman	0.103	0.083	-0.296	1.16
Porcano	0.180	0.235	-6.716	2.56

1983 (n=1164)

Measure	Mean	Median	Min	Max
Joint Committee	0.190	0.260	-35.210	2.38
Shevlin	0.298	0.402	-7.565	4.20
Stickney and McGee	0.306	0.397	-30.559	51.03
Zimmerman	0.100	0.083	-1.800	2.11
Porcano	0.374	0.233	-6.526	204.15

Table A1 (continued)

1984 (n=1013)

Measure	Mean	Median	Min	Max
Joint Committee	0.257	0.271	-5.120	18.70
Shevlin	0.319	0.400	-12.307	11.68
Stickney and McGee	0.328	0.394	-13.264	17.77
Zimmerman	0.109	0.089	-2.653	1.57
Porcano	0.217	0.247	-1.159	7.74

1985 (n=878)

Measure	Mean	Median	Min	Max
Joint Committee	0.243	0.258	-5.221	12.06
Shevlin	0.288	0.398	-19.118	5.67
Stickney and McGee	0.317	0.398	-7.834	10.94
Zimmerman	0.101	0.080	-0.493	1.07
Porcano	0.203	0.235	-1.399	1.12

1986 (n=771)

Measure	Mean	Median	Min	Max
Joint Committee	0.286	0.302	-8.234	7.69
Shevlin	0.324	0.421	-6.051	5.31
Stickney and McGee	0.331	0.421	-2.256	3.35
Zimmerman	0.101	0.083	-0.199	0.78
Porcano	0.218	0.288	-26.103	5.82

Table A2

Summary Statistics For Size by Year
(Total Sample and Grouped by Treatment of Deferred Tax Expense)

Total Sample

Year	Mean	Std Dev	Median	Min	Max
1980 (n=1137)	1397.01	5154.25	229.26	0.2950	103143.00
1981 (n=1002)	1621.12	5884.98	258.29	0.2930	108108.00
1982 (n=842)	1731.11	6059.63	273.26	0.2690	97172.80
1983 (n=1164)	1586.06	5781.90	203.56	0.1110	88560.63
1984 (n=1013)	1799.00	6206.72	280.36	0.2300	90854.00
1985 (n=878)	2049.13	6952.52	309.27	0.2190	96371.63
1986 (n=771)	2036.69	5819.63	357.26	0.0270	69888.00

Deferred Income Tax Expense = Change in Deferred Tax Liability

Year	Mean	Std Dev	Median	Min	Max
1980 (n=291)	376.720	953.066	84.8550	0.2950	10316.70
1981 (n=232)	260.897	528.321	69.5545	0.2930	4977.49
1982 (n=205)	577.123	3459.820	57.2210	0.2690	47524.01
1983 (n=279)	317.150	823.597	51.6390	0.1110	7039.00
1984 (n=249)	504.300	1820.734	56.8110	0.2350	19572.60
1985 (n=230)	509.591	1553.154	62.9795	0.2190	17123.50
1986 (n=188)	536.607	1992.517	46.9820	0.0270	22789.00

Deferred Income Tax Expense > Change in Deferred Tax Liability

Year	Mean	Std Dev	Median	Min	Max
1980 (n=454)	1653.798	5133.137	311.023	0.4000	59510.02
1981 (n=442)	1998.441	6005.809	357.156	1.1070	64488.02
1982 (n=382)	2323.625	7527.820	387.116	4.7510	97172.81
1983 (n=533)	2149.376	7548.874	300.625	3.3750	88560.63
1984 (n=453)	2242.333	7277.747	353.025	3.9430	90854.00
1985 (n=356)	1932.430	4702.814	379.568	4.2650	52774.31
1986 (n=291)	2641.986	7002.366	596.685	4.5450	69888.00

Table A2 (continued)

Deferred Income Tax Expense < Change in Deferred Tax Liability

Year	Mean	Std Dev	Median	Min	Max
1980 (n=392)	1857.036	6702.297	291.770	2.7160	103143.0
1981 (n=328)	2074.771	7447.413	402.605	1.2750	108108.0
1982 (n=255)	1771.229	5035.623	443.425	6.6720	59946.02
1983 (n=352)	1738.863	4698.338	265.908	1.6590	44454.61
1984 (n=311)	2189.847	6640.347	459.115	8.0870	83889.81
1985 (n=292)	3404.065	10633.260	544.752	7.1660	96371.63
1986 (n=292)	2399.281	6020.694	477.145	4.9450	51250.02

Table A3

Summary Statistics for Effective Tax Measures by Year
(Deferred Income Tax Expense = Change in Deferred Tax Liability)

1980 (n=291)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.193	0.217	0.228	-1.719	1.04
Shevlin	0.288	0.245	0.382	-1.697	0.86
Stickney and McGee	0.288	0.245	0.382	-1.697	0.86
Zimmerman	0.100	0.110	0.074	-0.054	0.64
Porcano	0.192	0.210	0.190	-1.000	1.23

1981 (n=232)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.102	0.864	0.106	-11.773	0.90
Shevlin	0.213	0.673	0.366	-8.837	1.21
Stickney and McGee	0.213	0.673	0.364	-8.837	1.21
Zimmerman	0.115	0.257	0.058	-0.071	3.07
Porcano	0.090	0.906	0.073	-12.990	0.56

1982 (n=205)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.134	0.255	0.002	-1.888	1.34
Shevlin	0.213	0.330	0.329	-2.466	0.99
Stickney and McGee	0.213	0.330	0.329	-2.466	0.99
Zimmerman	0.090	0.140	0.039	-0.075	1.16
Porcano	0.136	0.233	0.000	-1.197	1.39

1983 (n=279)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.121	0.259	0.000	-2.943	0.77
Shevlin	0.226	0.436	0.241	-4.365	4.19
Stickney and McGee	0.226	0.436	0.241	-4.365	4.19
Zimmerman	0.074	0.204	0.025	-1.800	2.11
Porcano	0.171	0.598	0.000	-0.638	9.54

Table A3 (continued)

1984 (n=249)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.127	0.559	0.000	-5.120	6.61
Shevlin	0.235	0.627	0.257	-5.118	6.61
Stickney and McGee	0.235	0.627	0.257	-5.118	6.61
Zimmerman	0.072	0.150	0.030	-0.885	1.57
Porcano	0.128	0.186	0.000	-0.369	0.48

1985 (n=230)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.123	0.204	0.000	-1.512	0.80
Shevlin	0.258	0.426	0.256	-0.220	5.67
Stickney and McGee	0.258	0.426	0.256	-0.220	5.67
Zimmerman	0.071	0.103	0.027	0.000	0.59
Porcano	0.142	0.196	0.000	-0.293	1.12

1986 (n=188)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.134	0.210	0.000	-1.086	0.66
Shevlin	0.208	0.394	0.027	-2.192	3.35
Stickney and McGee	0.208	0.394	0.027	-2.192	3.35
Zimmerman	0.071	0.112	0.014	-0.183	0.66
Porcano	0.154	0.222	0.000	-0.204	1.19

Table A4

Summary Statistics for Effective Tax Measures by Year
(Deferred Income Tax Expense > Change in Deferred Tax Liability)

1980 (n=454)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.236	0.239	0.288	-2.548	1.84
Shevlin	0.370	0.158	0.418	-0.496	0.74
Stickney and McGee	0.342	0.299	0.406	-1.741	3.63
Zimmerman	0.127	0.112	0.105	-0.135	1.13
Porcano	0.182	0.613	0.253	-8.481	2.75

1981 (n=442)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.212	0.687	0.280	-13.4230	2.28
Shevlin	0.294	1.490	0.417	-30.2235	4.17
Stickney and McGee	0.331	0.644	0.400	-3.9131	9.64
Zimmerman	0.135	0.218	0.104	-0.0689	3.74
Porcano	0.197	0.280	0.244	-2.2500	1.45

1982 (n=382)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.246	0.298	0.269	-1.203	3.60
Shevlin	0.335	0.806	0.418	-13.840	3.03
Stickney and McGee	0.298	0.799	0.400	-7.898	4.97
Zimmerman	0.113	0.097	0.093	-0.296	0.60
Porcano	0.170	0.297	0.212	-2.736	1.37

1983 (n=533)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.218	0.215	0.261	-2.121	1.13
Shevlin	0.365	0.246	0.418	-3.192	1.51
Stickney and McGee	0.321	2.684	0.398	-30.559	51.03
Zimmerman	0.118	0.096	0.096	-0.205	0.82
Porcano	0.581	8.837	0.237	-1.246	204.15

Table A4 (continued)

1984 (n=453)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.278	0.913	0.264	-1.774	18.70
Shevlin	0.393	0.567	0.413	-1.864	11.68
Stickney and McGee	0.353	1.084	0.395	-13.264	17.77
Zimmerman	0.132	0.180	0.110	-2.653	1.11
Porcano	0.227	0.411	0.251	-1.159	7.74

1985 (n=356)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.251	0.747	0.254	-5.221	12.06
Shevlin	0.324	0.574	0.417	-8.444	1.43
Stickney and McGee	0.306	0.837	0.404	-7.834	10.94
Zimmerman	0.127	0.121	0.099	-0.091	1.07
Porcano	0.196	0.233	0.247	-1.259	0.64

1986 (n=291)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.247	0.633	0.279	-8.230	5.38
Shevlin	0.387	0.507	0.432	-6.051	5.31
Stickney and McGee	0.359	0.336	0.422	-2.256	2.90
Zimmerman	0.131	0.100	0.118	-0.124	0.78
Porcano	0.253	0.396	0.281	-2.145	5.82

Table A5

Summary Statistics for Effective Tax
Measures by Year
(Deferred Income Tax Expense < Change in Deferred Tax Liability)

1980 (n=392)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.342	0.391	0.363	-2.817	5.2
Shevlin	0.302	0.729	0.419	-12.012	1.4
Stickney and McGee	0.379	0.156	0.423	-0.564	1.0
Zimmerman	0.109	0.096	0.095	-0.184	0.5
Porcano	0.274	0.243	0.335	-2.300	2.2

1981 (n=328)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.353	0.434	0.361	-0.534	7.4
Shevlin	0.351	0.225	0.415	-1.354	0.8
Stickney and McGee	0.379	0.153	0.423	-0.520	0.7
Zimmerman	0.113	0.103	0.098	-0.273	0.6
Porcano	0.288	0.228	0.337	-1.103	1.6

1982 (n=255)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.350	0.598	0.351	-3.927	6.44
Shevlin	-0.119	4.724	0.405	-68.134	1.06
Stickney and McGee	0.351	0.225	0.413	-1.600	0.85
Zimmerman	0.098	0.098	0.082	-0.134	0.44
Porcano	0.229	0.532	0.338	-6.716	2.56

1983 (n=352)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.201	1.930	0.348	-35.2108	2.38
Shevlin	0.253	0.621	0.412	-7.5657	0.81
Stickney and McGee	0.346	0.316	0.420	-1.5537	3.65
Zimmerman	0.094	0.123	0.075	-0.9941	0.61
Porcano	0.221	0.482	0.315	-6.5261	1.41

Table A5 (continued)

1984 (n=311)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.330	0.411	0.344	-2.140	6.18
Shevlin	0.279	0.788	0.406	-12.307	0.76
Stickney and McGee	0.365	0.188	0.413	-1.529	0.81
Zimmerman	0.103	0.097	0.089	-0.335	0.58
Porcano	0.272	0.197	0.328	-0.479	1.13

1985 (n=292)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.328	0.314	0.342	-2.024	2.93
Shevlin	0.265	1.19	0.396	-19.118	2.46
Stickney and McGee	0.375	0.213	0.409	-1.233	1.90
Zimmerman	0.092	0.097	0.076	-0.493	0.47
Porcano	0.258	0.211	0.316	-1.399	0.89

1986 (n=292)

Measure	Mean	Std Dev	Median	Min	Max
Joint Committee	0.422	0.657	0.363	-2.6408	7.69
Shevlin	0.337	0.462	0.426	-2.6085	4.11
Stickney and McGee	0.382	0.215	0.433	-1.5649	0.86
Zimmerman	0.090	0.086	0.077	-0.1999	0.51
Porcano	0.224	1.570	0.353	-26.1034	2.92

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